WE CLAIM:

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1. A method for producing information-carrying polymers, comprising:
   I. defining a regular grammar G = (∑, V, R, S) with a finite terminal alphabet ∑, a finite set of variables V, a finite set of rules R, and a start symbol S;
   II. the NFR method (Niehaus-Feldkamp-Rauhe method) for producing monomer sequences;
   III. implementing, with the NFR method, a grammar defined in Step I, by producing with the NFR method monomer sequences that unambiguously represent the set of rules R of a grammar G;
   IV. assembling, from the monomer sequences manufactured in Step III, for each rule of the set of rules R of G an oligomer representing that rule;
   V. linking the oligomers assembled in Step IV to information-carrying polymers.

2. Method according to claim 1, characterized in that the terminal alphabet ∑ of a grammar G contains terminals 0 and 1, n start terminals s (s_0, s_1, …, s_n) and m end terminals e (e_0, e_1, …, e_m), wherein n and m are integers larger than or equal to 0.

3. Method according to claim 1 or 2, characterized in that the monomer sequence constructed in Step III includes nucleotides, in particular ribonucleotides, most preferably deoxyribonucleotides.

4. Method according to claim 3, characterized in that the monomer sequence constructed in Step III includes protein recognition sequences (such as restriction cut sites, protein binding sites or stop codons).

5. Method according to any of the preceding claims, characterized in that the

synthesis of the monomer sequences in Step II and III is carried out in vitro, preferably with an oligonucleotide synthesizer.

6. Method for isolating and amplifying information-carrying polymers that have been obtained in accordance with any of the preceding claims, characterized in that the information-carrying polymers obtained in Step V are ligated into cloning vectors, competent cells are transformed with these vectors, and the successfully transformed bacteria are selected according to selection markers.

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7. Method for reading information from information-carrying polymers that have been obtained or isolated and amplified in accordance with any of the preceding claims, characterized in that

- a) one pair of anti-sense primers each is mixed into at least n-1 solutions containing the information-carrying polymer, wherein n is the number of oligomers contained as elongators in the polymer;
- b) carrying out at least n-1 PCR approaches, wherein n is the number of oligomers contained as elongators in the polymer, and one primer of each pair primes in the terminator opposite to the elongator and the other primer primes in the elongator itself;
- c) the polymer fragments obtained by PCR are separated by length using electrophoresis; and
- d) the pattern obtained by electrophoresis is read out optically.

8. Method according to claim 7, characterized in that the reading out in Step d) is performed automatically with a scanner or a sequencing machine.

9. Information-carrying polymer obtained in accordance with one of the claims 1 to 6.

10. Random number generator comprising information-carrying polymers, in

particular polymers in accordance with claim 9.

11. Polymeric data storage comprising polymers in accordance with claim 9.

12. DNA-computer comprising polymers in accordance with claim 9.

13. Biochip comprising polymers in accordance with claim 9.

14. Use of information-carrying polymers in accordance with claim 9 to manufacture molecular weight standards.

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15. Use of information-carrying polymers in accordance with claim 9 to represent data structures.

16. Use of information-carrying polymers, in particular of polymers in accordance with claim 9 as markers or signatures.

17. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of quality assurance.

18. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of forgery protection.

19. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling genetically engineered products.

20. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling food.

21. Use of information-carrying polymers, in particular of polymers in accordance

with claim 9, for the purpose labeling organisms.

22. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling chemical products.

23. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling medical and pharmaceutical products.

24. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling documents.

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25. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling money.

26. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling objects and machinery.

27. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of labeling liquids, solutions, suspensions or emulsions.

28. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, to encrypt information.

29. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, for the purpose of authenticating persons and objects.

30. Use of information-carrying polymers, in particular of polymers in accordance with claim 9, as molecular-scale adhesives.

31. Use of information-carrying polymers in accordance with claim 9 to

manufacture or process smallest molecular structures.

32. Use of information-carrying polymers in accordance with claim 9 for quality control of synthetically produced oligonucleotides.

33. Use of information-carrying polymers in accordance with claim 9 to manufacture biochips.

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34. 1- to n-byte nucleic acids, in particular 1- to n-byte nucleic acids obtained by any of the claims 1 to 6.

35. 1- to n-byte biochips, in particular 1- to n-byte biochips obtained by any of the claims 1 to 6.

36. Use of biochips, in particular of biochips in accordance with any of the claims 13, 33 and 35, as a data storage.

37. Use of biochips, in particular of biochips in accordance with any of the claims 13, 33 and 35, to manufacture optical display devices or display screens.

38. Use of information-carrying polymers, in particular polymers in accordance with claim 9, to label individual molecules, in particular nucleic acids, most preferably of genes.

39. Use of nucleic acids to encrypt information.

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40. Use of nucleic acids to encrypt information, characterized in that for decryption, short nucleic acid sequences (primers) are used as the key.

41. Use of information-carrying polymers, in particular polymers in accordance

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with claim 9, to encrypt information, characterized in that the information-carrying polymer is concealed in a multitude of other polymers.

42. Use of polymers for the purpose of labeling, characterized in that the polymers are encrypted.

43. Manufacturing biologically active molecules with controlled, programmable linking of sequences.

44. Manufacturing biologically active molecules by using algomers.

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45. Method for reading information from information-carrying polymers obtained or isolated and amplified in accordance with any of the claims 1 to 6, characterized in that biochips are used for the reading.

46. Use of the NFR method to manufacture biochips.

47. Use of the NFR method to manufacture nano-technological components or components of nano-technological modular systems.

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